

BOOK REVIEWS

GLOSSARY OF GENETICS AND CYTOGENETICS, CLASSICAL AND MOLECULAR, by R. Rieger, A. Michaelis and M. M. Green, with pp. 647. Fourth completely revised edition. ISBN 3-540-07668-9. Berlin-Heidelberg-New York, Springer-Verlag, 1976. US \$14.80.

The new Glossary is an impressively efficient looking book with some 3 500 entries and 1 700 references. The print is clear and readable and the text is liberally interspersed with clear schematic line drawings. Arrows ($\rightarrow$) indicate cross-references. Its size, $20 \times 14 \times 3$ cm, makes it easy to handle and, although the review copy has a soft cloth cover, it is strongly bound and should last well.

The third edition (the first English edition) has been in our department for many years and I have consulted it frequently. However, on being asked to review the new edition I realized that consulting and reviewing this kind of book are quite different. One usually consults a glossary for the meaning of terms in fields of the subject with which one is not familiar. On the other hand, in assessing the value of the book as reviewer, one is restricted to the assessment of terms in one's own specialized field. My impression of this book after having looked at it as a reviewer in the field of quantitative genetics is one of disappointment with the quality and the accuracy of the text. I present the following examples in support of this criticism.

- p. 24 *allozygote* (McKusick, 1973)—“a genetic compound, i.e., heterozygous for different alleles”. This definition is incomplete and misleading. Crow and Kimura (1970) follow the notation of Cotterman in designating an individual whose two homologous genes are identical by descent as autozygous. If the two alleles are of independent origin, the individual is said to be allozygous. Allozygotes can therefore be either homozygotes or heterozygotes. The term autozygote is not included in the Glossary. This is a pity because it could have been used to avoid the muddle in describing the effects of inbreeding on page 290. In passing, McKusick (1973) is not included in the bibliography.

- p. 53 *breeding value*. In terms of the definition given here it is incorrect to omit the factor of 2.

- p. 111 *coancestry*. Falconer (1960) has been misquoted. The definition should refer to the degree of relationship by descent, not to the degree of identity by descent of the two parents. Also it is incorrect to say that coancestry may be used in place of the coefficient of relationship.

- p. 112 *coefficients of coancestry, kinship and parentage* are given on the same page. They refer respectively to individuals I & L, A & B, and X & Y and different words are used to describe these synonyms. It is an apt example of what Crow and Kimura (1970) have described as a “bewildering plethora of alternative names”.

- p. 112 *coefficient of relationship*—“the probability that two individuals have inherited a certain gene from a common ancestor, or the proportion of all their allelic genes that have been inherited from common ancestors”. This merely adds to the general bewilderment and the situation is certainly not clarified by the definition of genetic relationship given on page 243.

- p. 124 *correlated response* (Wigan and Mather, 1942)—“a change in one character (phenotype) occurring as an incidental consequence of selection for a seemingly independent character”. This represents one of two major schools of thought. In this “linkage school” the correlated response has low predictability. The “pleiotropy school” uses genetic correlation to predict correlated response. Omitting the latter is inexcusable irrespective of one’s own affiliation. It is interesting to note that genetic correlation is not listed in its own right but is included with character (p. 74) and phenotype (p. 417). In each case both pleiotropy and linkage are given as possible causes of genetic correlation. It is interesting to note also that the following statement is made on page 494 under the listing of selection: “Artificial selection applied to one character almost always leads to changes in others (“correlated response”)”. Again, in passing, Wigan and Mather (1942) is not included in the bibliography.
- p. 252 *genetic value*—“the phenotypic value an individual would have if there were no environmental variation and no dominance effects”. This is a very strange definition. It is cross-referenced to genetic variance (p. 254) where it is said that, “Genetic variance can be divided into two components: 1. g.v. resulting from differences between homozygotes (additive g.v.); 2. g.v. resulting from specific effects of various alleles in heterozygotes (dominance variance)” and that, “Dominance here refers to deviations of the heterozygote from the two homozygotes”. When presented with this kind of draft by a student I find myself suggesting gently but firmly that he re-consult his references, that he give more thought to the matter and that he rewrite the section concerned.
- p. 256 *genotype-environment interaction*. Although no reference is given it is fairly clear that Falconer’s (1960) provisional clearance of the decks of complications when discussing the additivity of variance components has been rather ineptly summarized. No further attempt has apparently been made by the compilers to understand the concept.
- p. 267 *heritability*. It is stated *inter alia* that, “Heritability is a measure of the amount of genetic variability, excluding that expressed by heterozygotes . . .”. This muddle arises I think from the assumption, evidenced in the Glossary in the definitions of genetic value and genetic variance, that pure additivity of gene action is a prerequisite for additive genetic variance.
- p. 290 *inbreeding coefficient* (Wright, 1929). It is stated that, “If the frequencies of two alleles (A and a) in a population are p_A and q_a and the inbreeding coefficient is F , then the chance that an individual will be genotypically AA is pF The chance that the two alleles at that locus will not be identical by descent is $1-F$ ”. This is incorrect. The expected frequency of AA autozygotes is pF while the expected frequency of AA allozygotes is $p^2(1-F)$. In passing, the reference to Wright (1929) is inappropriate and the page number given in the bibliography is incorrect.
- p. 339 *maternal effect*—“any nonlasting effect of the maternal genotype or phenotype on the immediate offspring.” I do not think a maternal effect is necessarily of limited duration nor do I think that a definition of maternal effect without mentioning maternal environment is adequate. I think “immediate” is an inappropriate choice of word in so far that it is used with a specific meaning by both Penrose (1954) and Robson (1955) in describing maternal effects.
- p. 445 *progeny selection and progeny test*. The definitions are not precise and there is no mention of or cross-reference to breeding value. The ingredients for predicting selection response are given without saying why they should be considered.

p. 496 *selection response*. After nearly three pages devoted to various forms of natural and artificial selection including definitions of selection coefficients, pressures, differentials and limits, selection response reads, in full: "the gain in liability due to selection which is a function of the heritability of liability, assuming that genotype-environment interactions are absent. If A is the mean liability of affected individuals (those in the tail of the general population distribution), and R the mean of their offspring, then the realized gain in liability is $R-A$ ". This to say the least is inappropriate since no prior reference or cross-reference is made to threshold characters. A few words concerning the predictability of selection response could surely have been included?

In fairness to the compilers I feel I must repeat that I am not competent to judge the text as a whole. At the same time I do not think they are competent in the field of quantitative genetics and it is a pity they did not include in their team one who is.

J. S. ALLAN

KRYPTOGAMEN. BLAUALGEN, ALGEN, PILZE, FLECHTEN, by K. Esser, with pp. 573 + xvi, illus. Berlin-Heidelberg-New York, Springer-Verlag, 1976. DM58.00

Even though this book is bound in a soft cover it is a sturdy volume of convenient size (16.5 × 24 cm). The text appears to have been typed and reproduced photographically on good quality white glossy paper and is clear and easy to read. Two type sizes have been employed, the smaller one instead of italics, without creating an unbalanced effect.

Except for occasional spelling errors there is little fault to be found with the accuracy of the text. It is, however, also important to remember that taxonomic systems and arrangements are subject to personal interpretation, and a reader may be surprised at finding some taxa included in unexpected categories. Some taxonomic names which have been rejected for some time are again used in this book. By and large, however, the taxonomic framework followed is acceptably up to date.

There is an abundance of illustrative material. The drawings are well done and clear, as are the diagrams. The photographs are on the whole well chosen but are unfortunately rather soft, with few definite blacks or whites. The overall impression is thus of rather dull illustrations which lack the brilliance they could have had. A number of photographs have also been retouched to accentuate desired areas. This could mislead a student into believing that the detail he is looking for on a microscope preparation is more obvious than it in actual fact is.

There are comparatively few references in the text. Those that are used are given as footnotes and not combined into a single list. This does mean that to find a reference which has previously been quoted can prove extremely troublesome. There are, however, comprehensive lists of suggested references, grouped under a variety of headings, at the back of the book. These are extremely useful to student readers, but do not compensate for the frustrations referred to above.

The index is comprehensive and detailed and there is also a list of taxa, an essential in a book of this nature.

The book is aimed primarily at teachers of cryptogamic botany, would be very useful for postgraduate students at Honours level but is not suitable for the unaided undergraduate. The research worker will not find much in it. Certain sections would not apply to South African conditions but on the whole the information given could be applicable. However, as the book is written in the German language, its local appeal is likely to be extremely limited. Despite its attractions the text does not offer so much that the non-German speaking reader will find it worth his while to translate it.

This book is not a textbook in the normally accepted sense. It is intended to give a brief review of the basic facts about the blue-green algae, the algae, the fungi and the lichens, followed by a section on technology where fixatives, media, preservatives, sampling and

handling techniques, etc. are given. The bulk of the volume (approximately 480 pages) is then devoted to detailed discussions of individual organisms representative of the various taxonomic subdivisions.

Techniques for finding and isolating organisms are followed by life cycle diagrams, recommendations on cultivation and examination and, in most cases, photographs or drawings of the various stages. Suggestions as to possible genetic experiments or other demonstrations are also plentiful.

Whereas the book is thus extremely useful to the lecturer planning a course in cryptogamic botany, the average student will find it difficult to obtain a coherent picture of the organismic groups covered without extensive additional reading or assistance. As the book is written for European conditions the South African lecturer will find some of the suggested experimental organisms or programmes inappropriate.

There is, furthermore, a very important gap in the treatment of the fungi, and that is a totally inadequate discussion of the Fungi Imperfecti. They are a large and successful group of fungi and there are dynamic developments which are not even mentioned. Only eight pages are devoted to the imperfect fungi and more than three of these to the dermatophytes.

The book ends with a useful section, admittedly less so for South African readers, containing addresses of culture collections and suppliers of teaching films.

Despite its shortcomings, a highly interesting book.

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